



Utah County Fire Marshal

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Underground & Aboveground LPG Tank Requirements

The following information is to be used whenever underground or aboveground propane tanks are installed in unincorporated Utah County. This information is to correlate with the NFPA 58 (2011 Edition) and the International Fire Code (2012 Edition). **One set of plans** must be submitted and a permit must be obtained prior to any underground or above ground LPG tank installation. All fees for such permits must be paid in advance. Permits are required for all tanks above 125 gallon water capacity in unincorporated Utah County.

All approved LPG installations and burying of underground tanks and lines must be witnessed in the presence of an LPG licensed contractor and fire code official.

Underground LPG Tanks

1. Installer Certification:

Installation and burying of any LPG tank(s) are only to be done by individuals or companies that are certified and licensed through the Utah State Fire Marshal's Office. (R710-6)

2. Tank Capacities, and Type:

The maximum aggregate capacity of any one installation will not exceed a water capacity of 4,000 gallons unless approved by Utah County Fire Marshal. Tanks must be approved for underground installation. (NFPA 4.3.1, IFC 6104.2)

3. Sand Base:

Although concrete foundations are required, sand should still be used in the bottom of the hole for drainage. It is a good practice to put a 6 to 12-inch layer of coarse sand in the bottom of the hole before setting the tank. (NFPA 6.6.6.1 k)

4. Water Tables:

Underground LPG tanks are not allowed in areas of Utah County where high water tables exist or in federal flood zones, unless approved by the Fire Marshal. Provisions must be made to adequately secure the tank to the ground, or by a concrete slab to prevent flotation. Remember that a properly filled propane tank can float because the density of propane is about half that of water. Where straps come in contact with the tank, protection between the tank and the straps is to be provided. Thick tar-paper, celetex, etc. that is water resistant will suffice. (NFPA 6.6.1.6)

5. Corrosion Protection Equipment:

In order to reduce the problem of corrosion of underground LPG tanks, sacrificial anodes are to be installed in the ground near the tank. The anodes are connected by a copper cable to the tank. Anodes are usually a soft metal, such as magnesium or zinc. They are made as solid rods or stakes, as well as soft powder in small bags. These must be installed as per tank manufactures specifications. (NFPA 6.14)

6. Tank Coating:

Underground tanks must be designed and coated for underground installation. They are usually factory coated. However, coatings may have been scratched off during transportation and installation. As a result, the tank must be touched up with same type of paint or coating on site prior to being installed in the ground. [NFPA 6.6.6.1 (I) & 6.6.6.2 (A, B)]

7. Tank Depth:

The top of the tank when set in the hole must be at least six (6) inches below grade. If the tank is to be installed in an area where vehicles may travel close to the tank, 18-inches of compacted earth will be set below grade. [NFPA 6.6.6.1 (A, B)]

8. All Underground Tanks Will Be Supported:

All tanks will be supported by a minimum 4 inch (min) thick concrete pad that covers all tank supports.

9. Backfill:

The hole is to be backfilled with coarse sand and will be free of rocks and abrasives. The tank surface is not to be scratched. A minimum of twelve (12) inches of backfill is to be tamped down around the tank, then an additional twelve inches is filled in and tamped, etc. until the hole is full. [NFPA 6.6.6.1 (O), Annex K 6.6.6.1]

10. Location of Containers:

The minimum separation between containers installed underground will be three (3) feet. No part of an underground ASME container will be less than 10 feet from a building or line of adjoining property that can be built upon. See attached tables. (NFPA table 6.3.1, IFC 6104)

11. Vehicular Traffic:

Where containers are installed underground and within 10 feet of where vehicular traffic can be expected, protection against vehicular damage will be provided for the fitting housing cover, tank connections and piping. [NFPA 6.6.6.1 (B, C, E)]

12. LPG Testing of Piping System:

All residential piping for LPG installations will be tested a minimum of 10 minutes and tested with an approved gas detector, a non-corrosive leak detection fluid or other approved leak detection methods. (NFPA 6.14, NFPA 54 *National Fuel Gas Code*)

13. Burying Lines:

Buried metallic pipe and tubing shall be installed underground with a minimum 12 in. of cover. The minimum cover shall be increased to 18 in. if external damage to the pipe or tubing from external forces is likely to result. If a minimum 12 in. of cover cannot be maintained, the piping shall be installed in conduit or shall be bridged (shielded). (NFPA 6.9.3.12) Where underground piping is beneath driveways, roads, or streets, possible damage by vehicles shall be taken into account. (NFPA 6.9.3.13)

14. Tracer Wire:

An electrically continuous corrosion-resistant tracer wire (minimum AWG 14) or tape shall be buried with the polyamide or polyethylene pipe to facilitate locating the pipe. (NFPA 6.9.4.6)

(A) One end of the tracer wire shall be brought aboveground at a building wall or riser.

(B) The tracer wire or tape shall not be in direct contact with the polyamide or polyethylene pipe.

Underground LPG Tank Inspection Checklist

- Plans are submitted and approved showing tank placement.
- Tank does not exceed 5,000 gallons water capacity.
- Tank will be installed and buried by a licensed and certified person or company approved by the Utah State Fire Marshal's Office.
- Permit for tank installation must be on site.
- Tank must be ASME approved as indicated on the tank.
- Provide proper sand base for tank.
- Concrete base with protected tie downs in areas with high water tables. (Must be approved prior to installation)
- Sacrificial anodes are installed in the ground near the tank as per manufactures specifications.
- Perform leak detection on piping and fittings.
- If scratched, the tank must be touched up on-site prior to being installed in the ground.
- Proper depth and compacted earth as required.
- Proper vehicular protection where needed.
- Location of the tank complies with regulations of the NFPA 58 and IFC Chapter 61.

Aboveground LPG Tanks

1. Installer Certification:

Installation of any LPG tank is only to be done by individuals and companies that are certified by the Utah State Fire Marshals Office.

2. Tank Capacities:

The maximum aggregate capacity of any one installation will not exceed a water capacity of 5,000 gallons.
(IFC 6104.2)

3. Tank Locations:

Tank location must comply with proper distances from buildings, roadways, property lines, separation distances from other tanks and away from overhead electrical lines. (Consult IFC Table 6104.3, last pages of the pamphlet). (NFPA 6.3.1)

4. Combustible Materials:

Weeds, grass, bush, trash and other combustible materials are kept a minimum of 10 feet away from LPG tanks. (IFC 6107.3)

5. Guard Posts:

If exposed to vehicular damage due to proximity to alleys, driveways or parking areas, LPG tanks, regulators and piping will be protected by guard posts constructed of steel, not less than four inches in diameter, filled with concrete. Posts are to be spaced not more than 4 feet apart, buried three feet in the ground in concrete not less than fifteen inches in diameter. Set with the tops of the posts not less than three feet above the ground and located not less than three feet from the tank. Other means of tank protection if approved may consist of landscape type boulders, cement walls. etc. (NFPA amended)(IFC 6107.4)

6. Underneath Buildings:

LPG cylinders cannot be installed underneath any building unless the space is open to the atmosphere for 50 percent of its perimeter or more. (NFPA 6.3.7)

7. Painting:

The tank is to have a light color to prevent heat absorption. (NFPA 6.6.1.4, Annex A 6.6.1.4)

8. Power Lines:

The LPG tanks and any of its parts, will not be located within 6 feet of a vertical plane beneath overhead electric power lines that are more than 600 volts. (NFPA 6.4.5.12)

9. Installation Foundation:

Tanks will be installed upon a firm foundation or be otherwise firmly secured. Recommended is a 4-inch thick concrete pad. The cylinder will not be in contact with the soil. (NFPA 6.6.2.1)

10. LPG Testing of Piping System:

All residential piping for LPG installations will be tested a minimum of 10 minutes and tested with an approved gas detector, a non-corrosive leak detection fluid or other approved leak detection methods. (NFPA 6.14, NFPA 54 *National Fuel Gas Code*)

11. Burying Lines:

Buried metallic pipe and tubing shall be installed underground with a minimum 12 in. of cover. The minimum cover shall be increased to 18 in. if external damage to the pipe or tubing from external forces is likely to result. If a minimum 12 in. of cover cannot be maintained, the piping shall be installed in conduit or shall be bridged (shielded). (NFPA 6.9.3.12) Where underground piping is beneath driveways, roads, or streets, possible damage by vehicles shall be taken into account.(NFPA 6.9.3.13)

12. Tracer Wire:

An electrically continuous corrosion-resistant tracer wire (minimum AWG 14) or tape shall be buried with the polyamide or polyethylene pipe to facilitate locating the pipe. (NFPA 6.9.4.6)
(A) One end of the tracer wire shall be brought aboveground at a building wall or riser.

(B) The tracer wire or tape shall not be in direct contact with the polyamide or polyethylene pipe.

Aboveground LPG Tank Inspection Checklist:

- Plans are submitted and approved showing tank placement.
- Tank does not exceed 4,000 gallons' water capacities.
- Tank installed by a licensed and certified company approved by Utah Fire Marshals Office.
- Permit for tank installation on site.
- Tank must be ASME approved as indicated on the tank.
- Tank is located per IFC Table 6104.3.
- Weeds, grass, bush, trash and other combustible materials are kept a minimum of 10 feet away from the LPG tank.
- Guard posts if required, installed for protection of the tank.
- LPG cylinders cannot be installed underneath any building.
- The LPG tank is located in relation to overhead power lines.
- Tanks will be painted and maintained with light color such as white/silver.
- Tank is installed upon a firm foundation and/or is firmly secured.
- Perform leak detection on piping and fittings.

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TABLE 6104.3

LOCATION OF LP-GAS CONTAINERS

LP-GAS CONTAINER CAPACITY (water gallons)	MINIMUM SEPARATION BETWEEN LP-GAS CONTAINERS AND BUILDINGS, PUBLIC WAYS OR LOT LINES OF ADJOINING PROPERTY THAT CAN BE BUILT UPON		MINIMUM SEPARATION BETWEEN LP-GAS CONTAINERS^{b, c} (feet)
	Mounded or underground LP-gas containers^a (feet)	Above-ground LP-gas containers^b (feet)	
Less than 125 ^{c, d}	10	5 ^e	None
125 to 250	10	10	None
251 to 500	10	10	3
501 to 2,000	10	25 ^{e, f}	3
2,001 to 30,000	50	50	5
30,001 to 70,000	50	75	(0.25 of sum of diameters of adjacent LP-gas containers)
70,001 to 90,000	50	100	
90,001 to 120,000	50	125	

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

a. Minimum distance for underground LP-gas containers shall be measured from the pressure relief device and the filling or liquid-level gauge vent connection at the container, except that all parts of an underground LP-gas container shall be 10 feet or more from a building or lot line of adjoining property which can be built upon.

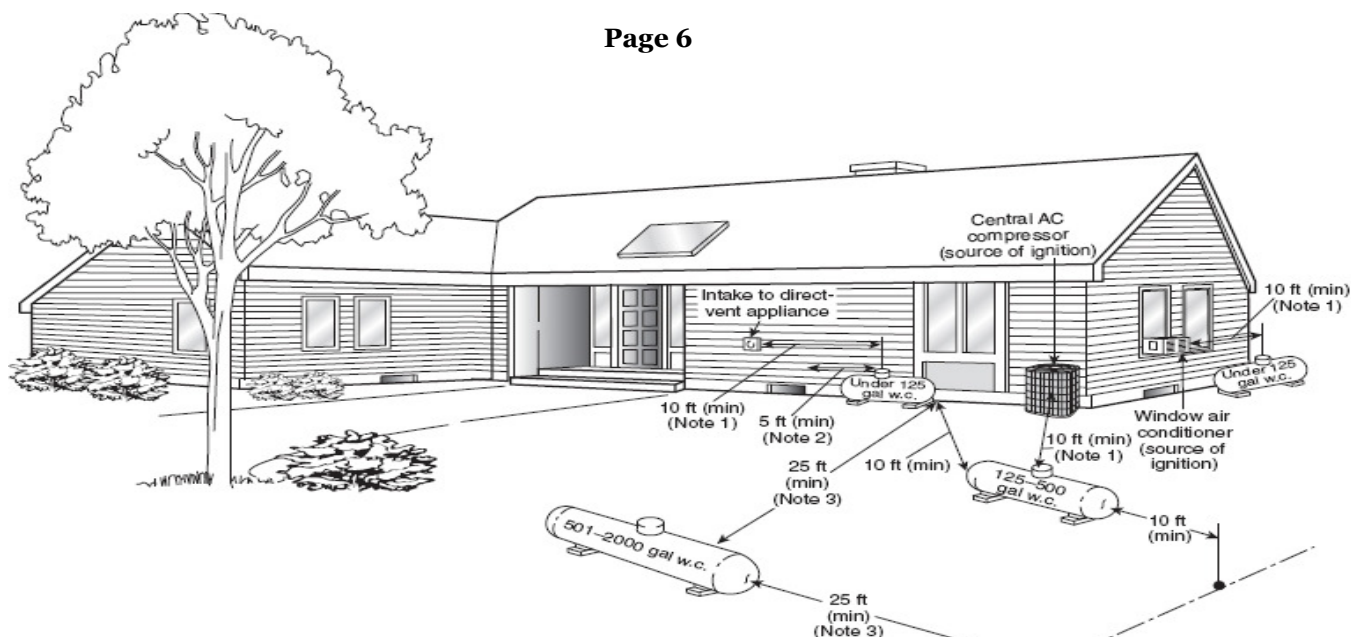
b. For other than installations in which the overhanging structure is 50 feet or more above the relief-valve discharge outlet. In applying the distance between buildings and ASME LP-gas containers with a water capacity of 125 gallons or more, a minimum of 50 percent of this horizontal distance shall also apply to all portions of the building which project more than 5 feet from the building wall and which are higher than the relief valve discharge outlet. This horizontal distance shall be measured from a point determined by projecting the outside edge of such overhanging structure vertically downward to grade or other level upon which the LP-gas container is installed. Distances to the building wall shall not be less than those prescribed in this table.

c. When underground multi-container installations are comprised of individual LP-gas containers having a water capacity of 125 gallons or more, such containers shall be installed so as to provide access at their ends or sides to facilitate working with cranes or hoists.

d. At a consumer site, if the aggregate water capacity of a multi-container installation, comprised of individual LP-gas containers having a water capacity of less than 125 gallons, is 500 gallons or more, the minimum distance shall comply with the appropriate portion of Table 6104.3, applying the aggregate capacity rather than the capacity per LP-gas container. If more than one such installation is made, each installation shall be separated from other installations by at least 25 feet. Minimum distances between LP-gas containers need not be applied.

e. The following shall apply to above-ground containers installed alongside buildings:

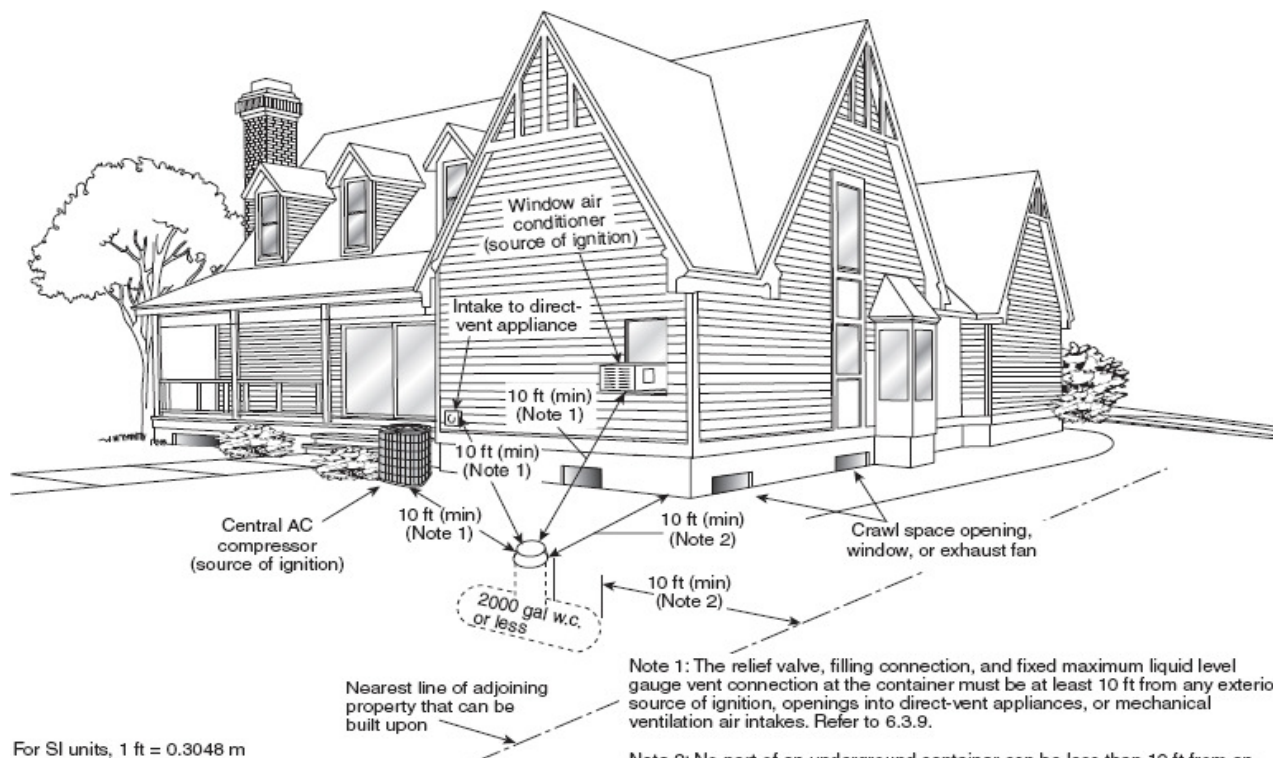
1. LP-gas containers of less than a 125-gallon water capacity are allowed next to the building they serve when in compliance with Items 2, 3 and 4.
2. Department of Transportation (DOTn) specification LP-gas containers shall be located and installed so that the discharge from the container pressure relief device is at least 3 feet horizontally from building openings below the level of such discharge and shall not be beneath buildings unless the space is well ventilated to the outside and is not enclosed for more than 50 percent of its perimeter. The discharge from LP-gas container pressure relief devices shall be located not less than 5 feet from exterior sources of ignition, openings into direct-vent (sealed combustion system) appliances or mechanical ventilation air intakes.
3. ASME LP-gas containers of less than a 125-gallon water capacity shall be located and installed such that the discharge from pressure relief devices shall not terminate in or beneath buildings and shall be located at least 5 feet horizontally from building openings below the level of such discharge and not less than 5 feet from exterior sources of ignition, openings into direct vent (sealed combustion system) appliances, or mechanical ventilation air intakes.
4. The filling connection and the vent from liquid-level gauges on either DOTn or ASME LP-gas containers filled at the point of installation shall not be less than 10 feet from exterior sources of ignition, openings into direct vent (sealed combustion system) appliances or mechanical ventilation air intakes.
- f. This distance is allowed to be reduced to not less than 10 feet for a single LP-gas container of 1,200-gallon water capacity or less, provided such container is at least 25 feet from other LP-gas containers of more than 125-gallon water capacity.



Note 1: Regardless of its size, any ASME container filled on site must be located so that the filling connection and fixed maximum liquid level gauge are at least 10 ft from any external source of ignition (e.g., open flame, window AC, compressor), intake to direct-vented gas appliance, or intake to a mechanical ventilation system. Refer to 6.3.9.

Note 2: Refer to 6.3.8.

Note 3: This distance can be reduced to no less than 10 ft for a single container of 1200 gal (4.5 m³) water capacity or less, provided such container is at least 25 ft from any other LP-Gas container of more than 125 gal (0.5 m³) water capacity. Refer to 6.3.3.



For SI units, 1 ft = 0.3048 m

Note 1: The relief valve, filling connection, and fixed maximum liquid level gauge vent connection at the container must be at least 10 ft from any exterior source of ignition, openings into direct-vent appliances, or mechanical ventilation air intakes. Refer to 6.3.9.

Note 2: No part of an underground container can be less than 10 ft from an important building or line of adjoining property that can be built upon. Refer to 6.3.4.2.